

# LIST

LONG ISLAND SINCLAIR TIMEX GROUP  
INCORPORATING \* NYTSE OF NEW YORK CITY

ISSUE: October 1989

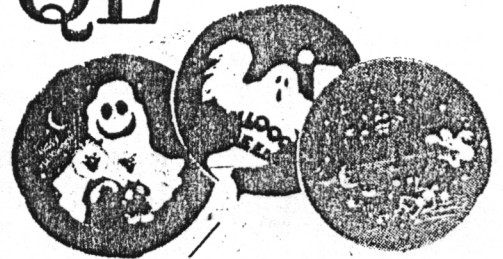
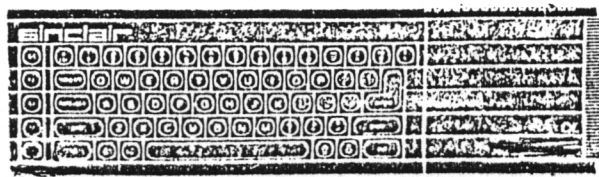


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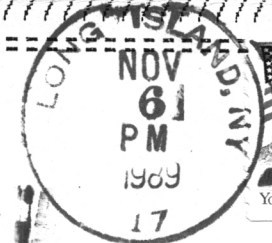
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MR. HARVEY RAIT  
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PLEASE SEND SUBMISSIONS TO:

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COMING EVENTS:  
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NOV. 12, 1989 LIST MEETING  
NOV. 13, 1989 NYTSE MEETING

MEETING MINUTES  
OCT. 15, 1989  
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THE MEETING WAS CALLED TO ORDER  
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THERE IS A LESSON TO BE LEARNED  
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AVAILABLE AS ACCESSORIES. THE  
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SEE DOMINO CUBES ADVERTISEMENT  
ON PAGE 7.

MIKE ALSO INFORMED US THAT  
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A FINAL WORD  
-----

MY NAME IS FRED STERN, AND I AM  
THE EDITOR OF THIS EDITION OF  
LISTING.  
I HAVE BEEN ASKED TO PRINT MORE  
ARTICLES ABOUT THE QL. THANKS TO  
PAUL DONNELLY FOR THE MATERIAL  
HE DONATED TO MAKE THIS QL ISSUE  
POSSIBLE.  
I ALSO THANK JOHN PAZMINO FOR  
HIS CONTRIBUTION.  
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## THE AMERICAN QL A PEEK INSIDE

Fred Nachbaur

Most ZX81 hardware articles start with, "Remove the five screws...." Getting at the guts of the QL is somewhat more involved than this, so here is an article that fully details how to completely tear down your QL, and then put it all back together. Future articles may then assume that you know how to dismantle and successfully re-assemble your machine. Along the way, we'll point out the major components and various other landmarks.

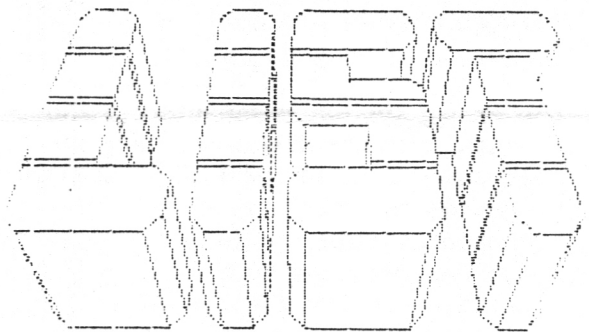
Why would you even want to tear into your brand new QL? I'm usually one to admonish, "if it works, don't fix it." However, there are significant advantages to becoming familiar with the actual hardware of your computer. Once you've seen what's inside, it is no longer as mysterious and forbidding, so you will be more comfortable with the system as a whole. You'll see how it's all put together, so you'll have a better idea of its mechanical strengths and limitations. Lastly, you'll have less phobias about installing internal upgrades and improvements as they are developed.

More immediately, there are two simple modifications that you can make to the American QL to improve it significantly. The first, insuring against any possibility of crashes due to faulty regulator bypassing, is covered later in this article. (This one won't even require any soldering.) The second, covered in another article, details how to use your machine with an NTSC (American standard) composite colour monitor (including sound, if available on your particular monitor).

Although the QL is very definitely a "quantum leap" beyond the previous Sinclairs, it is still, unmistakably, a SINCLAIR machine. Specific similarities with previous ZXes will be pointed out as we go along. More generally, however, the QL shares the same philosophy of open hardware architecture that characterized the earlier Sinclairs. All CPU lines are available at the user ports, and all major chips (except RAM are socketed. Compare with the Atari 520ST, in which the WRITE line is not available from the outside, preventing any RAM expansions. Not only that,

but the CPU is soldered in! Boo, hiss! (I refuse to work with a machine that I can't get at. I recently got a good deal on a TI99/4A, but gave it away when I found that getting at the main circuit board was a major operation.)

The QL can be completely disassembled with simple hand tools. There are no rivets, welds or long solder beads to prevent access to any part of the machine. There are no weird screws requiring special drivers, lock-tabs that break off the first time you open them, or anything like that. This is not to say that things aren't tight inside that sleek black box. I'm sure that more than one engineer had sleepless nights trying to cram all that stuff in. In some places, clearances are literally zero. So exercise care and patience when working with the QL. These qualities, coupled with a modicum of mechanical skill, will be all it takes to make QL "hardware hacking" easy and enjoyable.



EDITORIAL

YOUR ARTICLE

COULD HAVE APPEARED

HERE

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article!**

MUCHAS GRACIAS

—FRED

The bare-minimum collection of tools you will need are:

- 1: A good #1 Phillips screwdriver
- 2: A pair of needle-nose pliers
- 3: A fine-tip, 25W soldering iron
- 4: A roll of good rosin-core, 60% tin solder.

Other useful tools include a wire-stripper, a "soldering aid" to hold down hot wires, a multimeter (any type), methanol or isopropanol and Q-tips (how appropriate!) for cleaning, and a wrist grounding-strap (just to be sure about static). "Solderwick" and a "Soldapult" or similar suction-type solder remover can come in handy. More sophisticated tools like wire-wrappers will only be needed if you delve into "roll-your-own" hardware projects.

## QL CONSTRUCTION

Like the previous ZXes, the QL consists basically of two case-halves made of an ABS plastic. The case-halves are held together from the bottom by means of 8 self-tapping screws. The entire system is mounted in the lower case-half, with the top containing only the keyboard assembly and the LED indicator lights. This allows the machine to operate for testing purposes while partially disassembled. Also like previous machines, the entire system (sans Microdrives) is on one large double-sided glass-epoxy circuit board. The Microdrives are separate assemblies, with their own small circuit boards as an integral part of their construction. Since it's unlikely that you'd be servicing these on a component basis, their further disassembly won't be covered here.

QL disassembly can be broken down into three levels, or "phases." Phase 1 is a partial disassembly to access the main computer board. Phase 2 is a more complete disassembly, involving the removal of the Microdrives and the main board (necessary only if you need access to the non-component side of the board). Phase 3 is keyboard removal, which will only be necessary if you replace the membrane keyboard pad or keys. Both of the projects in this issue require only Phase 1 disassembly, but you might be inclined to do Phase 2 also, just for the experience.

## PHASE 1 DISASSEMBLY

1: Remove the four short screws at the front of the machine, and the four long screws at the rear. There are two medium-length screws under the Microdrives; these only support the Microdrives, so you don't need to remove them for Phase 1.

2: Set the machine right-side-up, lift up the top case half, and GENTLY disconnect the keyboard tails from their sockets. This is the weakest part of the machine's mechanics, and the one ZX feature I wish they HADN'T carried over to the QL.

3: Disconnect the LED wires from their socket. The socket is a type you may not have seen before; DON'T try to simply pull the wires out. Instead, grasp the black plastic portion of the socket and pull it upwards. This will unlock the wires, and they will all fall out. (Don't worry about what wire went where; I'll cover that in the section on re-assembly.)

4: The top case half will now be free, and can be set aside.

Your machine may or may not have little fibre washers glued to the top of the mounting studs on the Microdrives. These studs aren't used in the QL, so Sinclair uses these little shims to take up any slack that would cause rattles, etc. Be aware that they're there, as they are quite easily knocked off.

## THE GRAND TOUR

Well, look at all that stuff. Right off, you might notice the thoroughness of the shielding on this machine. The top case-half has a metal plate affixed with conductive paint, which contacts a spring-strap on the modulator case. This prevents the conductive inner coating from wearing away from repeated dis-assembly. The keyboard back-plane is similarly grounded to the conductive coating. Even the expansion-board cover is grounded with a spring-strap, making the machine an almost perfect "Faraday cage." The English QL, by the way, is not nearly as well-shielded; presumably this is because European TV (UHF) is much less prone to interference.

Another difference is that the keyboard back-plane on the American version is made of



Cadmium-plated steel instead of aluminum, making the overall computer significantly heavier.

All the way to the left, right next to the expansion connector, is the 68008 CPU. Having it close to the expansion connector minimizes lead length, and problems that could result from excessive trace lengths. The ground terminals are bridged with a solid piece of wire, and a small disc capacitor bypasses the V+ lead. These "tack-ons," absent on the British version, are directly soldered to the CPU pins. This is something I might be inclined to do, but I wouldn't have expected such constructions from a major computer manufacturer.

Right next to the CPU is the first of the three custom chips. If you look at the part number, you'll see that this one is "ZX8301." Remember rumours back in 1983 about a "ZX83?" Well, the QL is it. The ZX8301 chip takes care of TV picture generation, system clocking and address decoding, DRAM refreshing and controlling the bus.

Another custom chip is "ZX8302" (near the center of the board). This one controls the operation of all peripheral devices, including the Microdrives, net, real-time clock, and anything else you have connected.

Finally, there's "ZX83V0.7" (near the Microdrives). This is an Intel 8049 custom 8-bit microprocessor, with 2K of on-chip ROM and 128 bytes of RAM. Sinclair terms this the "Intelligent Peripheral Controller," (IPC) as it is a completely self-sufficient computer in itself. It works with ZX8302 to handle all I/O operations, including the keyboard, speaker and RS232 ports.

Near the front of the board is the memory array, consisting of 16 4164A's (1 bit x 64K). Affixed with silicone cement to the left end of the array is a little tack-on board consisting of a high-speed CMOS hex inverter (only one gate used) and a couple resistors. Its function is a mystery at present, and the hardware manual offers no explanation. This, too, is absent on the British machine.

Between ZX8301 and ZX8302 are the two ROMs, one 16K and one 32K. By the time the ROMs were commissioned, Sinclair had apparently

changed the name from "ZX83" to "QL," as reflected by the ROM designations.

The expansion connector and the ROM socket are both supported only by their legs, but the joystick and serial port connectors are firmly bolted to a steel plate at the rear of the machine: another departure from the British version. Next to these is the TV modulator. In front of the modulator is the RGB video chip (MC1377). Another chip, MC1489, is used for NTSC composite video; this is the chip whose output we'll intercept to allow use with a colour composite monitor.

Various buffers, logic chips, transistors, diodes and regulators round out the semiconductor complement. Separate crystals are used to clock the main CPU (via ZX8301), the IPC, the MC1377 video chip, and the real-time clock.

The DIN monitor connector is of a type which prevents "tapping in" from the top of the board. Doing anything with this (such as inverting the RGB sync line internally) would therefore require Phase 2 disassembly.

At the front-right, of course, are the Microdrives. Their controller cards are bolted to the rear of the plastic "chassis." Note that the controller chips are Ferranti ULA's (that's right, the same people who made the logic chip for the ZX81). In passing, I'll point out a few features that contribute to the Sinclair drive's high reliability over similar schemes.

First, the drive is from the side rather than the front, minimizing tape damage from excessive insertion force. Secondly, the capstan is made of rubber instead of metal, minimizing the possibility of grit putting dents in the tape. They are also quite large, reducing the possibility of damage from having the tape stopped for an extended time. The heads are not adjustable, being soldered directly to the circuit board. This reduces the possibility of misalignment and resulting bad loads.

Behind the Microdrives is a big heat-sink for the 7805 regulator. This regulator is socketed, presumably for ease in assembly. Behind the heat-sink is another conspicuous add-on: a big toroidal inductor. This serves

exactly the same purpose as the two little coils on the ZX81, which is to prevent RF interference from travelling back out through the power supply line. However, it also causes the same regulator bug that plagues the ZX81! (See SyncWare News #3:4.) Come on, Sinclair, read the 7800-series spec sheets!

## DEBUG YOUR REGULATOR

The importance of this little modification cannot be overstressed. If you don't do it, you're playing Russian Roulette. Even if your machine seems to work fine, it can develop strange and unpredictable problems when you expand it, or line voltage changes, or virtually anything else. A 3-terminal regulator is very unstable if there is an inductor in its input line; the way to correct this instability is to install a small capacitor at its input.

Get yourself a .1 uF. capacitor rated 16 volts or better. Disc ceramic is OK, but I prefer tantalum. Clip the leads off to about 1 cm., and stick them into the regulator socket alongside the regulator legs. One terminal goes to the center leg, the other to the leg on the right (as viewed from the front). If you're using a tantalum cap, observe polarity; the "minus" lead goes to the center leg.

## PHASE 2 DISASSEMBLY

When continuing your tear-down, be alert to all washers, shims, etc. that appear as you progress. As mentioned earlier, Sinclair employs fibre washers on an as-needed basis to take up slack. Others are used to prevent shorts or provide pressure relief. Ideally, you should use an organizing tray to keep track of the small parts as you take your machine apart.

1: Follow steps 1-4 in "Phase 1 disassembly," above.

2: Remove the two medium-length screws that support the Microdrives from the bottom.

3: Remove the four screws (two per unit) that support the Microdrives from the top. These are the round-head, NOT the flat-head screws. Also note that they are not of the same length. The shorter one is the one in

the front left corner, the longer one is about 1 cm. to the right of the head.

4: Carefully unplug the ribbon cables that connect the Microdrives to the main board. The Microdrives will then lift out; set them aside.

5: Remove the cover on the Microdrive expansion connector. The board won't come out if you don't do this. Note also that the single "prong" on the cover must be on top when you re-install it; it won't fit properly the other way.

6: Disconnect the speaker wires.

7: Remove the two screws that mount the main board. One is just to the left of the CPU, the other is just behind and slightly to the right of the speaker.

8: The board is now free to come out. However, there are two snags: The first is the grounding strap for the ROM cartridge port; note its original position and gently bend it back. The second is the reset switch; you have to pull off the black knob (it's just a press-fit on the switch shaft). Fully depress the switch shaft as you ease the board out; even then, it will just barely clear.

## PHASE 3 DISSEMBLY

This will only be necessary if you damage the keyboard tails, requiring replacement of the membrane keyboard element. Cut the grounding foil on one side only, and remove the 7 screws. Fold the base-plate up, being careful not to tear the other grounding foil. The keyboard membrane can now be replaced.

## RE-ASSEMBLY

Re-assembly is exactly the reverse of the assembly steps. Some points to watch out for:

- \* Be VERY careful when re-connecting the Microdrives. Two needle-nose pliers can be used to advantage to re-insert the ribbon cables evenly.

- \* Be VERY VERY careful when re-connecting the keyboard tails. These are VERY EASILY damaged. Use a firm pressure, but don't let them kink.

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\* When re-connecting the LD wires, the colors of the wires (starting at the rear of the connector) are: Red, Black, White, Black, Green, Black. The exact locations of the three black wires is unimportant.

\* When re-installing the Microdrives, be sure that the speaker wires aren't pinched.

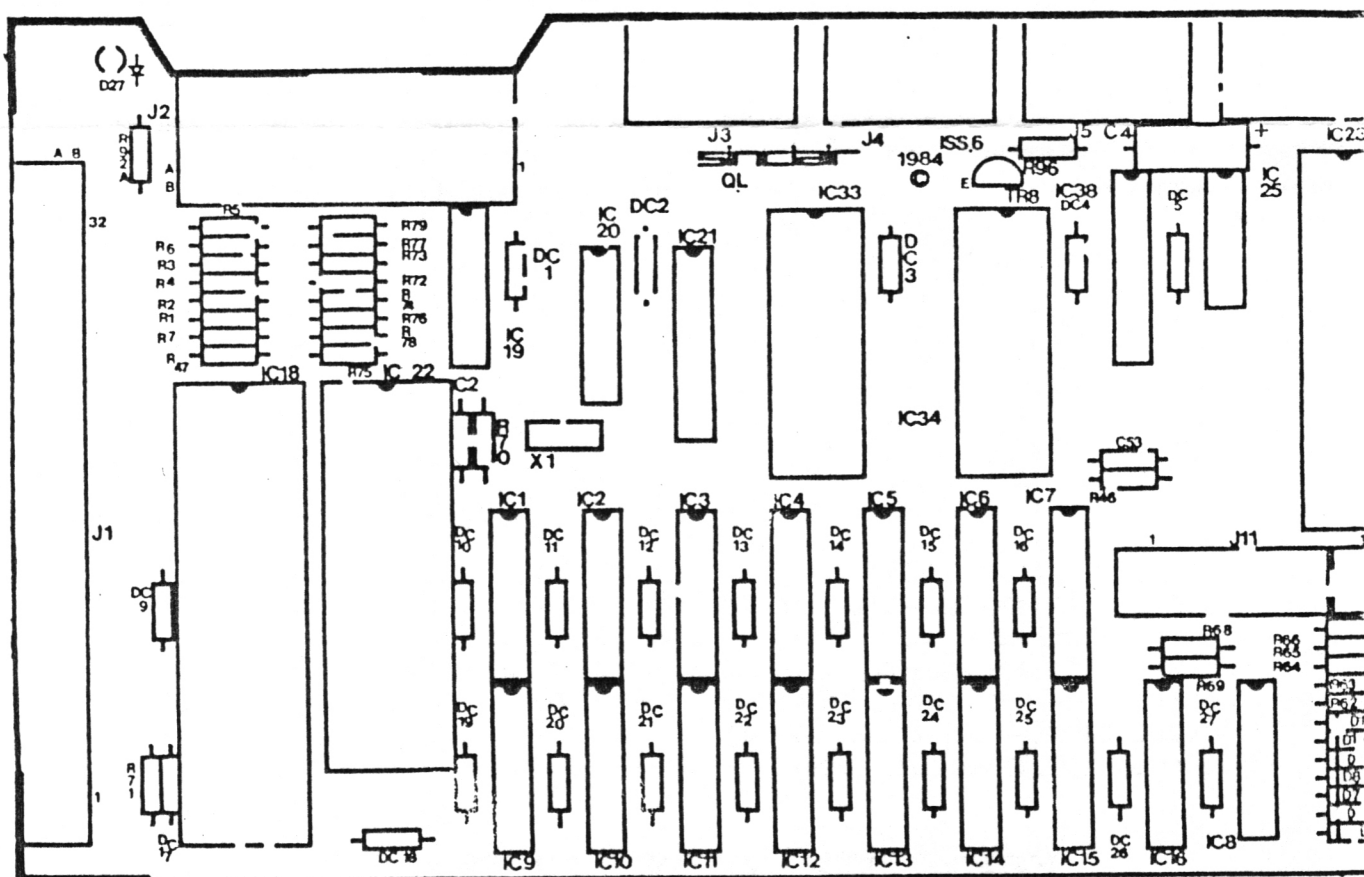
\* Don't over-torque the screws! Tighten them only until they are well-seated. Over-torquing will strip the threads in the studs.

\* There is a crystal folded over the MC1489 chip. It is possible for its grounding wire to touch a trace on the keyboard tail, resulting in a crash. To prevent this, put a piece of tape over the crystal.

Happy Hacking!

# QL IC PARTS LIST

Number	Part #	Manufacturer
IC 1 to 16	4164 (equiv)	Various (RAM)
IC 17	74HC04	(Spider Board)
IC 18	MC68008	Motorola
IC 19,20	74LS257	Various
IC 21	74LS245	Various
IC 22	ZX8301	Plessey/Sinclair
IC 23	ZX8302	NCR/Sinclair
IC 24	8049	NEC
IC 25	1488	NEC
IC 26	1489A	NEC
IC 27	74LS03	not used
IC 28	MC1377P	Motorola
IC 29 (MDV1)	2G007	Ferranti
IC 30 (MDV2)	2G007	Ferranti
IC 31 (MDV1)	78M05	various
IC 32 (MDV2)	78M05	various
IC 33	32K ROM JSU	
IC 34	16K ROM (23128)	
IC 35		not used
IC 36	79L12	various
IC 37	78L12	various
IC 38	HAL16L8	Sinclair



QL CIRCUIT BOARD (issue 6) COMPONENT LAYOUT



## COMPOSITE COLOR ON THE QL

Fred Nachbaur

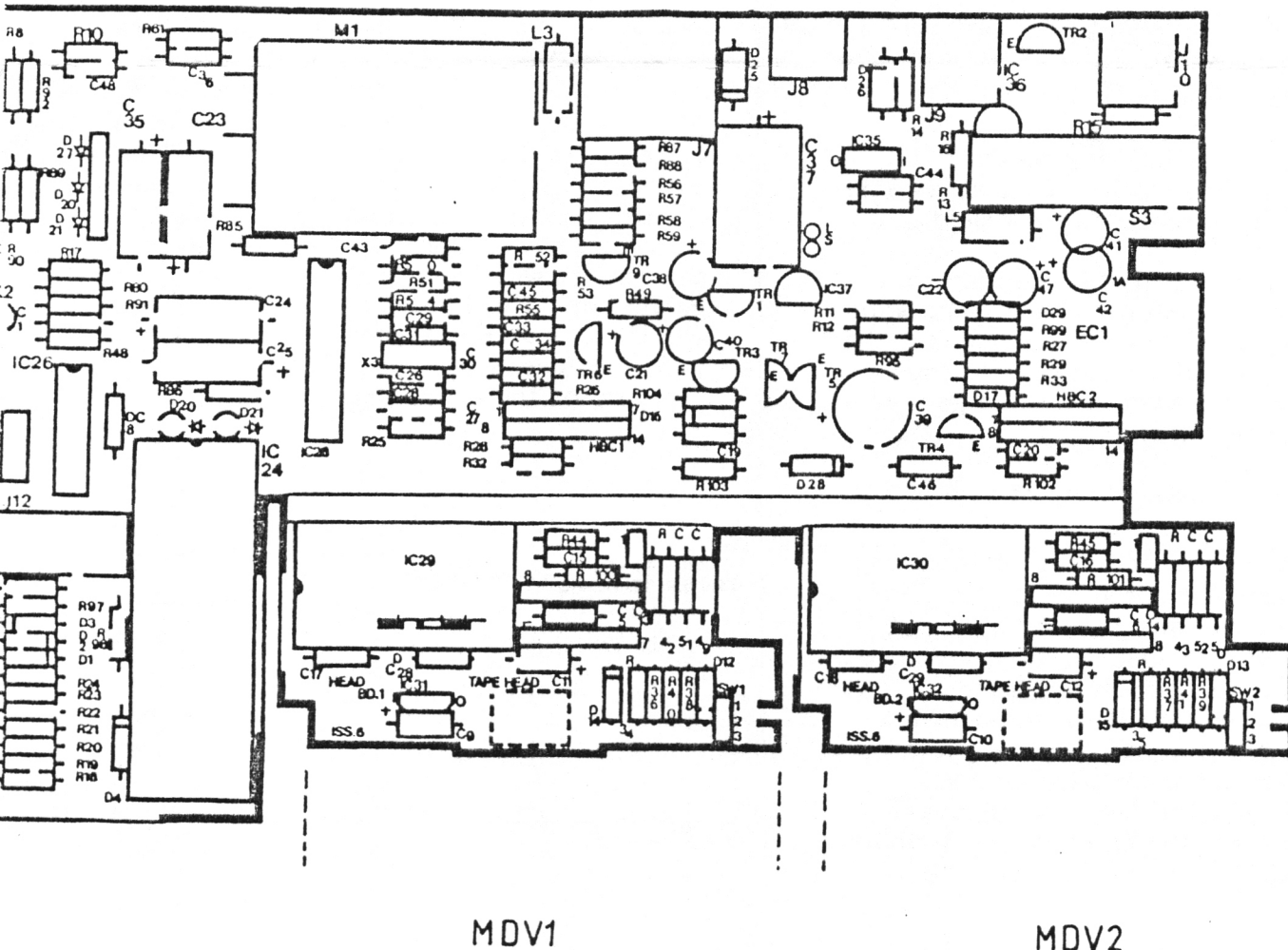
You might have bought a composite color monitor for a previous computer system, and then bought a QL with the assumption that you could use your monitor with it. I know how disappointed you felt when you found out that Sinclair made no provision to run NTSC (American standard) composite color monitors. Now you either have to live with monochrome, go back to the old family TV, or else shell out for an RGB monitor, right? Wrong! Believe it or not, the required video signal exists inside the QL, but isn't brought out to the connector. A few dollars and a simple hack job is all it takes to remedy the situation. The resulting image, while not as good as an RGB picture, is considerably better than the typical television set.

The idea is very simple. We merely take the NTSC video signal from the input of the TV

modulator! Implementing this requires only a couple connectors and lengths of cable, and a Phase 1 disassembly of the QL. [See the QL - A PEEK INSIDE article.]

Many monitors (such as the one I'm using) contain a built-in audio amplifier and speaker, so you can divert the QL sound output to the monitor at the same time. This results in a better tonal quality, as well as full control of the volume of the sound. Did you ever notice how the sound can seem barely audible during the daytime hustle and bustle, yet embarrassingly loud late at night? If you pipe it to your monitor, you can adjust the volume "to taste."

Before we get to the details, I should mention that not all color composite monitors will work properly if you select "monitor" mode (F1) on power-up. This is not so much the fault of the monitors, as it is the fact that the vertical retrace interval in this mode is 50 Hz. (European) instead of the 60



Hz. for which the monitors were designed. Monochrome monitors seem to be more forgiving about the discrepancy, but even they can show pulsing effects in this mode. Color monitors seem to be more finicky; my particular monitor shows a pronounced and annoying "breathing" in this mode. In "TV" mode (F2) it looks great. So this would appear to solve the problem, except that some software (e.g. QL CHESS) runs in "Monitor" mode regardless of what you select on power-up. Perhaps someone will discover a cure for this as time goes on. Meanwhile, it won't hurt to try it out with your particular unit.

I used a 1/8" stereo in-line phone jack connected to a short pig-tail of two-conductor "mic cable" to bring the audio and video signals out of the QL, and a mating plug to send the signals to the monitor. (This is the kind of phone connector used on "Walkman"-type portable stereos, and is available at Radio Shack.) This makes the pigtail coming out the back of the QL relatively small and unobtrusive. This text and the accompanying diagram assumes this type of connector. However, you may prefer another type of connector (e.g. a 3-pin DIN).

Here's how you go about doing it:

1: Prepare a short length (about 6") of two-conductor mic cable. That is, a cable with two wires surrounded by a shield.

2: Connect one end of this "pigtail" to a female 1/8" inline stereo phone jack. Note which wire goes to the tip (I made this the video terminal), and which goes to the inner conductor (audio). The shield goes to the "ground" terminal.

3: Do a Phase I disassembly of your QL.

4: Cut a channel, wide enough to pass your pigtail, in the rear apron of the QL. The best place to put this channel or cutout is right above the TV channel selector switch, to the left of the modulator. I used a soldering iron to melt down through the plastic; after letting it cool, the "flash" is easily trimmed away using an Xacto knife. Make the slot deep enough to prevent severely pinching the cable on re-assembly. (A mild "pinch" is beneficial, as it helps

prevent the pigtail from being pulled loose.) With the cable I used, I had to cut down about 7 mm.

5: Solder the shield to the top of the modulator case. Connect your video wire to the centre terminal of the modulator.

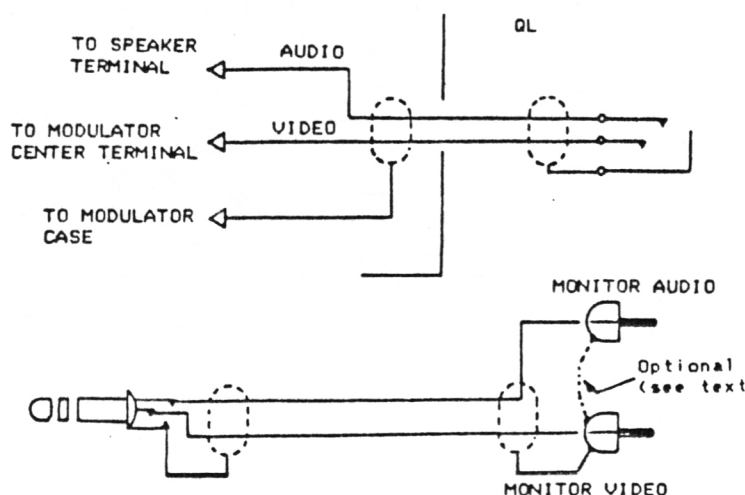
6: Disconnect the speaker by pulling up on the black plastic part of the socket until the wires easily pull loose. Tape up the exposed ends to prevent shorts, and tuck the wires somewhere out of the way.

7: Connect a 470-ohm resistor to the speaker socket. This resistor may not be necessary for your monitor or audio amp, but its installation is good practise. Connect your audio line to this resistor, at the terminal nearest the front of the computer.

8: Make up a cable to the monitor, with a male stereo phone jack at one end, and two RCA jacks (or whatever your monitor needs) at the other. See the diagram. Also refer to the notes below.

9: Test your set-up, then re-assemble the computer.

In most cases, it is NOT necessary or even desirable to connect the audio "ground" to the shield. Doing so with my monitor causes a ground loop, resulting in a low-level (yet annoying) 60 Hz. hum. The hook-up shown is the easiest way to connect two plugs to one cable; only if you get a hum with your particular monitor should you try running a jumper between the case of the video plug and the case of the audio plug.



# Sir Clive cried when I jilted him



**LOVESTRUCK** computer genius Sir Clive Sinclair burst into tears after his girlfriend refused to marry him, she revealed last night.

Sir Clive drove more than 200 miles in his Porsche to propose to Bernadette Tynan with a rare platinum and sapphire ring.

But Bernadette - a member of the high IQ society Mensa with an IQ of 154 - accepted the ring, then refused the proposal. Sir Clive immediately broke down and wept uncontrollably in front of her mother and father.

"It was the most upsetting night of my life," said Bernadette.

"Clive was desperate to rekindle our love but I had to tell him it was over. There was no use pretending."

At her parents' bungalow in Adlington, Lancashire, Bernadette flushed angrily at suggestions she has fallen out with 47-year-old Sir Clive.

"He is still very special to me," she said. "I would never criticise him because he meant a lot to me and still does. Some people are saying that I thought he was

**EXCLUSIVE by JOHN KELLY**

an old bore, but that is a complete lie." Bernadette told of her heartache when Sir Clive dashed to her home just over a month ago after reading a Sunday Mirror story on their split.

In his hand he clutched the platinum and sapphire ring he had ordered for her when they were still together.

"He was terribly upset and just sat down and wept and wept," she said. "Mum, dad and I felt awful because Sir Clive had become a good friend of the family."

"In the end, however, he pulled himself together and accepted that there was nothing left in our relationship."

"He let me keep the ring because it had been made specially for me. It will always remind me of him."

**B**UT Bernadette, 22, admitted she made a terrible mistake when she got engaged to the bearded boffin.

"I was young, stupid and naive, but that wasn't Sir Clive's fault. He is the only man I have ever slept with."

"But the more I was with him, the more I realised that I was just being treated like a bimbo."

"Lots of his friends just assumed that's all I was. It was brought home to me when I found out that his daughter Belinda had had a child - which would have made me a grandmother!"

"There were also problems with his first wife, Anne, who was upset that there would be a new Lady Sinclair."

"One time Clive had to go round and calm her down because she was so upset."

"I was not too popular with his ex-girlfriends either, and some of them still had keys to his home in Cambridge."

I never liked staying there."

But Bernadette, who now runs a financial consultancy in Preston, Lancashire, is adamant that she did the right thing by leaving Sir Clive.

"I had to do it for his sake and mine. It would never have worked," she said.

**T**HE couple met at a Blackpool conference organised by Mensa.

"At the end of the evening, I knew I wanted to see him again," Bernadette said afterwards. Within



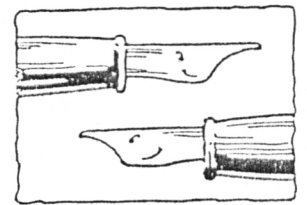
Heartbroken - Sir Clive

three months, computer whizzkid Sir Clive proposed over the telephone.

And he threw a huge party at his £750,000 Cambridgehire mansion to celebrate.

The same night, the couple made love for the first - and last - time.

We Thank  
John Pazmino  
for sending us  
The above  
Article



A Listing  
Exclusive

'I know I did the right thing' - ex-fiancee Bernadette

Picture: TONY WARD

From Pg 10

If your setup seems to work but the video level is too low (can't get enough contrast), then there is a higher-level point from which you can take your signal. This is directly at the output of the MC1377 (pin 9). This point is also accessible at the right end of the 180-ohm resistor (R85, brown-grey-brown) just in front of the modulator. Don't do this unless you really have to, since this increases the possibility of damaging the MC1377 in the (admittedly rare) event of a monitor malfunction.

If the audio level is far too high for your monitor's amplifier, try putting a resistor in series with the audio line. Start with 10K, and increase it until you get an acceptable level.

Looking for a bargain on composite monitors? (This is especially for those who have other computers with composite video outputs; if the QL is your only color machine, you'd be advised to purchase the QL "Vision" RGB monitor.) Check out the Commodore monitor, which is a very good unit for the price. Another one that's pretty good is the Sakata 13" SC-100, sold by JDR Microdevices for \$169. (This is the one I have.)

0>REM Medicare Income Tax  
by Herb Bowers, Sr.  
071189

1 REM Starting with your 1989 returns, all individuals eligible for Part A Medicare benefits will be subject to a tax "surcharge" if their tax liability exceeds \$150. The amount of the surcharge will be based on tax liability, with a maximum tax of \$800 for 1989.

2 REM If you are ELIGIBLE for Part A coverage, the surcharge will apply; you may not avoid the tax by waving Medicare benefits. Those eligible for Part A coverage include ALL individuals age 65 or older and other younger disabled persons.

3 REM The tax will not apply in the first year you become eligible unless you are eligible for more than 6 months of the year.

4 REM If both you and spouse are eligible for Part A the annual tax ceilings are doubled.

5 REM If only one spouse is eligible and a joint return is filed, the limit applies but the tax is based on 50% of the joint return liability regardless of which spouse earned the income.

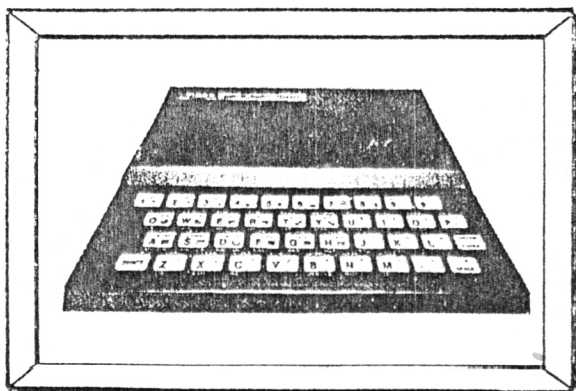
#### 6 REM TAX CEILINGS

1989	\$800
1990	850
1991	900
1992	950
1993	1050

7 REM Filing separate returns will not reduce the liability. Unless spouse live apart for the entire year, the tax ceiling in 1989 for each spouse on a separate return is \$1600, rather than \$800 making the maximum possible tax \$3200. If only one spouse is eligible both are treated as eligible on separate returns; the \$800 ceiling applies.

8 REM This short 2K program will quickly and accurately calculate the MEDICARE TAX for you. TO USE: Simply enter your tax liability from your 1988 income tax return or enter the amount of your estimated 1989 tax liability.

9 REM The IRS will publish a table to be use for the calculation of the tax but in the meantime you can determine the tax for yourself.



```

10 DEF FN a(f)=tax/150*r(f)
100 DATA 22.5,800,37.5,850,39,
    900,40.5,950,42,1050
110 POKE 23658,8: POKE 23609,10
120 CLS : LET q=0: LET t=0
130 DIM r(5): DIM s(5)
140 DIM t(5)
150 FOR f=1 TO 5
160 READ r(f),s(f)
170 NEXT f
1000 PRINT "MEDICARE INCOME TAX"
1010 PRINT "'WHAT'S YOUR FILING
STATUS? (1-5)"
1020 IF INKEY$="" OR INKEY$<"1"
OR INKEY$>"5" THEN GO TO 1020
1030 LET fs=VAL INKEY$: PRINT ,f
1040 IF fs<>2 AND fs<>3 THEN
GO TO 1160
1050 PRINT "'DO BOTH YOU AND SPO
USE QUALIFY FOR MEDICARE, PART
A ? (Y/N)"
1060 IF INKEY$="" OR INKEY$<"Y"
AND INKEY$>"N" THEN GO TO
1060
1070 LET q=INKEY$="Y"
1080 PRINT , "YES" AND q; "NO" AND
NOT q
1090 IF fs=2 THEN GO TO 1160
1110 PRINT "'DID YOU AND YOUR SP
OUSE LIVE TO-GETHER AT ANY TIME
DURING YEAR ?"
1120 IF INKEY$="" THEN GO TO
1120
1130 IF INKEY$="" OR INKEY$<"Y"
AND INKEY$>"N" THEN GO TO
1130
1140 LET t=INKEY$="Y"
1150 PRINT , "YES" AND t; "NO" AND
NOT t
1160 PRINT "'ENTER TAX LIABILITY
FROM YOUR LAST FEDERAL INCOME
TAX RETURN"
1170 INPUT tax: PRINT , "$";tax
1180 INPUT "IS THE ABOVE CORRECT
?", LINE q$
1190 IF q$(1)="N" THEN AL
1200 FOR f=1 TO 5
1210 IF t OR q THEN LET s(f)=
s(f)+2
1220 NEXT f
1230 IF fs=2 THEN LET tax=tax/2
1240 FOR f=1 TO 5
1250 IF tax<150 THEN GO TO 1290
1260 LET t(f)=FN a(f)
1270 IF (fs=2 AND q) OR t THEN
LET t(f)=t(f)*2
1280 IF t(f)>s(f) THEN LET t(f)=
s(f)
1290 NEXT f
1300 CLS
1310 PRINT (TAB 5;"MEDICARE INCO
ME TAX"
1320 PRINT (TAB 5;"YEAR");TAB 21;
"TAX"
1330 FOR f=1 TO 5
1340 IF t(f)>s(f) THEN LET t(f)=
s(f)
1350 PRINT (TAB 5;f+1988;TAB 20
+(t(f)<1000)+(t(f)<100)+(t
(f)<10);INT t(f)
1360 NEXT f
1370 PRINT AT 21,3;"COPY 2: AN
OTHER QUIT"
1380 IF INKEY$="C" THEN PRINT AT
21,0;TAB 31
: COPY
: GO TO 1370
1390 IF INKEY$="D" THEN RUN
1400 IF INKEY$="" THEN GO TO
1370
1410 STOP
9999 CLEAR : SAVE "medicaretx" L
INE 100: SAVE "medicaretx" LINE
100: SAVE "medicaretx" LINE 100:
VERIFY "": VERIFY "": VERIFY ""

```